PROBLEMS FOR SOLUTION.

ARITHMETIC.

98. Proposed by J. SCHEFFER, A. M., Hagerstown, Md.

A poor man borrowed $20.00 which he repaid in eleven monthly installments of $2.00 each; what was the annual rate of interest (reckoned as simple interest)?

99. If 300 cats catch 300 rats in 300 minutes, how many rats will 100 cats catch in 100 minutes? [From *Milne's Practical Arithmetic.*]

*** Solutions of these problems should be sent to B. F. Finkel, not later than Sept. 10.

ALGEBRA.

88. Proposed by E. S. LOOMIS, Ph. D., Professor of Mathematics in Cleveland West High School, Berea, O.

(1). The Indemnity Savings and Loan Company made two loans of $1000 each to "A", one of its borrowers, under the following terms: In the first loan "A" agrees to cancel the $1000 by making 120 payments of $13.50, the first payment to be considered as made on the first of the month in which the loan is made, and the 119 subsequent payments to be made on the first of each subsequent month; in the second loan "A" agrees to cancel the $1000 by making 120 payments of $13.50, the first payment being made on the first of the month following the loan, and the 119 subsequent payments being made on the first of the subsequent months, Does the Company sustain any loss in earnings by the second loan over the first loan, and if so how much, and when is (or are) this loss (or these losses) sustained, the rate of interest in each loan being considered as $10\frac{1}{2}\%$ per annum?

(2). Deduce a formula for each case of proposition (1), by means of which one can find the balance of the loan uncancelled at the end of *any* month, *if* the loan is fully cancelled in 120 payments.

*** Solutions of this problem should be sent to J. M. Colaw, not later than Sept. 10.

GEOMETRY.

99. Proposed by WILLIAM HOOVER, A. M., Ph. D., Professor of Mathematics and Astronomy; Ohio State University, Athens, Ohio.

Find the locus of the vertices of all right cones which have the same given ellipse as a base.

100. Proposed by CHARLES C. CROSS, Libertytown, Md.

O, O_1, O_2, O_3 are the centers of the inscribed and three escribed circles of a triangle ABC. Prove $AO.AO_1.AO_2.AO_3 = AB^2.AC^2$.

101. Proposed by E. W. MORRELL, A. M., Professor of Mathematics, Montpelier Seminary, Montpelier, Vt.

AB is the diameter of a circle and Q_0 any point on the circumference; Q_1, Q_2, Q_3.... are the points of bisection of the arcs AQ_0, AQ_1, AQ_2.... Prove that BQ_1, BQ_2, BQ_3.... $BQ_n = OA^n.(AQ_0/AQ_n)$.

*** Solutions of these problems should be sent to B. F. Finkel, not later than Sept. 10.